CLAIMS:

1. A magnetoresistive sensor having an MR stack biased by one or more hard bias elements, the sensor characterized by:

the hard bias elements are formed from a hard magnetic material deposited in a thin film having a substantially axial preferred direction of magnetic anisotropy prior to application of a setting field.

2. The magnetoresistive sensor of claim 1 wherein the preferred direction of the magnetic anisotropy of the thin film is in-plane and parallel to an air bearing surface of the MR stack.

3. The magnetoresistive sensor of claim 1 wherein the thin film of hard magnetic material has elongated domains oriented parallel to an air bearing surface of the MR stack.

4. The magnetoresistive sensor of claim 3 wherein the preferred direction of the magnetic anisotropy of the thin film is in-plane and parallel to an air bearing surface of the MR stack.

5. The magnetoresistive sensor of claim 1 wherein the hard magnetic material is oblique deposited at an angle selected from 60° up to 90° measured from a surface normal.

6. The magnetoresistive sensor of claim 5 wherein the oblique deposition is additionally oriented approximately normal to an air bearing surface of the MR sensor.

7. The magnetoresistive sensor of claim 6 wherein the oblique deposition is additionally oriented normal to an air bearing surface of the MR sensor and the oblique deposition may be wobbled about the normal orientation.

8. The magnetoresistive sensor of claim 1 wherein the thin film of hard magnetic material is deposited in a plurality of layers including layers A and layer B, wherein layer A is deposited generally perpendicular to the ABS direction followed by deposition of layer B, layer B being deposited generally perpendicular to the ABS direction, but 180° from the deposition orientation of layer A.

9. The magnetoresistive sensor of claim 8 wherein layer A and layer B are deposited at an oblique angle of deposition relative to a surface normal.

10. A hard bias element adjacent to an MR stack having a preferred magnetic anisotropy in a magnetoresistive sensor having an ABS, wherein the hard bias element is formed from a hard magnetic thin film material having elongated domains oriented parallel to the preferred magnetic anisotropy.

11. The hard bias element of claim 10 wherein the elongated grains are oblique deposited at an angle selected from 60° up to 90° measured from a surface normal.

12. The hard bias element of claim 10 wherein the elongated grains are oblique deposited at an angle selected from approximately 65° to approximately 75° measured from a surface normal.

13. The hard bias element of claim 10 wherein the hard magnetic thin film material has magnetic anisotropy induced in-plane along an axis parallel to the ABS prior to application of a setting field.

14. The hard bias element of claim 10 wherein the preferred magnetic anisotropy is perpendicular to the ABS.

15. An MR sensor comprising:

a MR stack having an air bearing surface;

a first hard bias element positioned adjacent to a first side of the MR stack and having elongated grains of hard magnetic material oriented parallel to the air bearing surface; and

a second hard bias element positioned adjacent to a second side of the MR stack and having elongated grains of hard magnetic material oriented parallel to the air bearing surface.

16. The MR sensor of claim 15 wherein the first hard bias element has a preferred direction of magnetic anisotropy in-plane and parallel to the air bearing surface and the second hard bias element has a preferred direction of magnetic anisotropy in-plane and parallel to the air bearing surface.

17. The magnetoresistive sensor of claim 15 wherein the hard magnetic material is oblique deposited at an angle selected from 60° up to 90° measured from a surface normal.

18. The magnetoresistive sensor of claim 17 wherein the oblique deposition is additionally oriented approximately normal to an air bearing surface of the MR sensor.

19. A method for inducing axial anisotropy in thin films of hard magnetic materials, the method comprising:

depositing a first layer of hard magnetic material by oblique deposition directed generally perpendicular to the desired axial anisotropy;

depositing a second layer of hard magnetic material by oblique deposition directed generally perpendicular to the desired direction of anisotropy and 180° from the deposition direction of the first layer; and

setting the hard bias material by application of a large magnetic field in the direction of axial anisotropy.

20. The method for inducing axial anisotropy of claim 19, wherein the oblique deposition is at an angle from 60° up to 90° measured from a surface normal.

21. The method for inducing axial anisotropy of claim 19, wherein the oblique deposition is at an angle selected from the range from approximately 65° to approximately 75° measured from a surface normal.

22. A method of fabricating an MR sensor, the method comprising:

depositing a first layer of hard magnetic material by oblique deposition directed generally perpendicular to the desired axial anisotropy;

depositing a second layer of hard magnetic material by oblique deposition directed generally perpendicular to the desired direction of anisotropy and 180° from the deposition direction of the first layer; and

setting the hard bias material by application of a large magnetic field in the direction of axial anisotropy.

23. The method for inducing axial anisotropy of claim 22, wherein the oblique deposition is at an angle from 60° up to 90° measured from a surface normal.

24. The method for inducing axial anisotropy of claim 22, wherein the oblique deposition is at an angle selected from the range from approximately 65° to approximately 75° measured from a surface normal.